

flywheel, a continuously variable transmission (CVT) coupled to said flywheel and one or more driven wheels coupled to said CVT, comprising the steps of:

a) generating a CVT speed ratio control signal as a function of CVT output torque and operator input; and

b) feeding back said CVT speed ratio control signal to said CVT for controlling the speed ratio of said CVT.

15. (New) The method of claim 14, wherein:

said CVT speed ratio control signal comprises an error signal equal to the difference between the CVT output torque and an operator error signal.

16. (New) The vehicle of claim 15, wherein:

said CVT speed ratio control signal comprises a time integral of said error signal equal to the difference between the CVT output torque and an operator error signal.

REMARKS

Background

This Amendment is filed in conjunction with a Request for Continued Examination (RCE).

This Amendment is in response to the Final Office Action mailed on June 9, 2004.

The Examiner objected to the disclosure as not including a cross-reference to its parent application 09/335,192 now US Patent 6,120,411.

Claims 1-3 were withdrawn in response to the first Office Action.

The Examiner rejected claims 4-7 under 35 U.S.C. 102 as anticipated by Tabor (US patent 3,858,674).

The Examiner rejected 4-7 claims 4-7 under 35 U.S.C. 103 as obvious over Tabor in view of Shigamatsu et al (US patent 4,715,258).

The Examiner rejected claims 4-7 as non-statutory over claims 1-3 of Booth, Jr. (US Patent No. 6,120,411) based on obviousness-type double patenting.

Applicant has amended claims 4-7 and added claims 8-16 including independent claims 8 and 14.

Claims 4-16 are pending in the application.

In view of the long history of the Application and the fact that Applicant's attorney may not have access to all the documents affecting the case or claims the Examiner is encouraged to review the claims and specification for accuracy.

Cross-Reference To Related Applications

As suggested by the Examiner, Applicant has amended the specification to add a reference to Application Ser. No. 09/335,192 now US Patent 6,120,411 which was the parent of this patent application and with respect to which this application is a continuation case. Accordingly, the Examiner's objection to the disclosure for not including such a reference should now be overcome.

Double Patenting

Applicant has amended claims 4-7. In view of these amendments Applicant submits that claims 4-7 are not obvious in view of US patent 6,120, 411 which was the parent of this application. Accordingly, Applicant Submits that the double patenting rejection is now obviated.

Amended Claims

Applicant has amended claims 4-7. Applicant submits that these amended claims more clearly claim the invention and clearly distinguish over the prior art.

New Claims

Applicant has added claims 8-16 (nine new claims). Applicant submits that these new claims improve the quality and character of Applicant's claim coverage while clearly claiming the invention and distinguishing over the prior art.

Anticipation By Tabor

The Examiner stated that Tabor discloses a wheeled vehicle which includes a flywheel for energy storage coupled to a continuously variable transmission (CVT) and coupled to at least one wheel of the vehicle and incorporating control of the CVT speed ratio based on feedback of CVT output torque. The Examiner did not cite a section in Tabor describing the concept of CVT speed control based on feedback of CVT output torque. Applicant can not find any hint or suggestion anywhere in Tabor of CVT control based on Torque or more particularly CVT output torque. The only control over the torque converters 14 (CVTs) shown in Figures 3 and 4 in Tabor appears to be the pedal 15 shown in Figure 3 and accelerator lever 50 shown in Figure 4 which seem to be manually operated (see column 5, lines 1-14 which should be read in conjunction with the immediately preceding description of Figure 4). Tabor describes a CVT that is manually controlled and does not describe any type of feedback system or feedback methodology as recited in Applicant's amended claims 4-7 or new claims 8-16.

In response to Applicant's arguments the Examiner stated that as broadly recited the feedback of output torque of Tabor is inherently a component of operation of the CVT; be it sensory feedback or mechanical feedback (while this may not be structurally the identically the same as Applicant's invention it does read on the claim as broadly recited). Again, Applicant can not locate any reference in Tabor to control of the torque converters by feedback of any type. Control over the torque converter is discussed with reference to Figure 5 at lines 1-14 of column 8. Operator action is described in order to increase vehicle speed

from 10kph to 80kph. No mention is made of the feedback of CVT output torque. If the Examiner is asserting that an operator may manually accomplish such feedback no suggestion for this exists in the reference. The reference does not show the CVT having feedback control system or method as claimed in claims 4-16.

Accordingly, Applicant submits that the rejection of claims 4-7 as anticipated by Tabor is overcome.

Obviousness over Tabor in view of Shigamatsu et al

The Examiner stated in the Office Action that Tabor disclosed the claimed invention except for the explicit recitation of the use of output torque feedback as a means for adjusting the CVT. The Examiner then asserted that Shigamatsu et al discloses the background art of using the output torque feedback to adjust the CVT to be at optimum efficiency (col. 1/lines 13-61) and that it would have been obvious to utilize the output torque feedback structure as explained in Shigamatsu. The Examiner is referred to lines 24-33 of column 2 of Shigamatsu et al where it is stated that " Further, in addition to such feedback control of the engine speed, the engine output torque is calculated as a function of the intake system throttle position θ or accelerator stroke and engine speed N_e , and the belt pressing pressure on the output side disk of the belt system CVT is controlled as a function of engine output torque T_e ..." The necessary input is provided by throttle position sensor 18 positioned on the internal combustion engine 1 as shown in Figure 4. This is further illustrated with respect to the embodiment shown in Figure 9. The primary inputs for the control of the CVT are throttle position from sensor 18 along with the input side rotational speed N_{in} of the CVT 4, which equates with engine speed N_e in this case, and the output rotational speed N_{out} of the CVT 4. The engine output torque T_e is calculated at block 60 however this is not the same as CVT output torque. CVT output torque is never calculated or used in controlling the CVT 4 as claimed by Applicant. Shigamatsu et al are primarily concerned with achieving minimum fuel

consumption and hence focused on engine control not on the control of the CVT.

- Shigamatsu et al simply don't show use of feedback of CVT output torque in controlling the CVT as recited in Applicant's claims 4-16.

Furthermore, even assuming Shigamatsu et al disclose the use of output torque feedback in adjusting a CVT, Tabor and Shigamatsu can not be properly combined to form an obviousness rejection. Tabor provides an inertial energy system having a manual system for controlling a CVT with a pedal or lever.

Shigamatsu et al describe an internal combustion engine driven vehicle where a CVT is controlled by line pressure in a hydraulic system in response to various engine parameters with the objective of minimizing fuel consumption.

Shigamatsu et al has nothing to do with inertial energy systems and these patents represent different types systems focused on different problems. No hint or suggestion exists in the references and no logical reason exists for combining the inertial energy system of Tabor having a manually controlled CVT with the automated CVT of the motorized system of Shigamatsu et al.

Accordingly, Applicant submits that the rejection of claims 4-7 for obviousness under 35 U.S.C. has been overcome.

Conclusion

Applicant requests reconsideration of the application as amended. Applicant submits that the claims are in condition for allowance. Applicant suggests that the Examiner call Applicant's attorney to discuss the status of the case and the best way to move forward the application forward.

Respectfully Submitted,

A handwritten signature in black ink, appearing to read "J. Horn", written over a horizontal line.

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